

October 29 at midnight. A real panic is reigning among the population of Cascia. The extent of the zone of the phenomena cannot yet be ascertained, but it seems that the eruption of Mount Etna is closely connected with it. Several old houses fell at the first shock.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus radiatus*) from India, presented by Mr. A. S. Gissing; two Common Herons (*Ardea cinerea*), British, presented by Mr. R. H. Rabbetts; a Common Barn Owl (*Strix flammea*), British, presented by Mrs. A. Wright; a Slender-billed Cockatoo (*Licmetis tenuirostris*) from South Australia, deposited; two Red-billed Tree Ducks (*Dendrocygna autumnalis*) from America, a Zenaida Dove (*Zenaida amabilis*) from the West Indies, purchased; a Hairy-rumped Agouti (*Dasyprocta prymnolopha*) from Guiana, received on approval.

BIOLOGICAL NOTES

APPARENT BIRD-TRACKS BY THE SEA-SHORE.—At a recent meeting (October 3) of the Academy of Natural Sciences of Philadelphia, Mr. Thomas Meehan called attention to what appeared to be the tracks of a three-toed bird in the sand near low water-mark, at Atlantic City. These tracks were of a nature that would be readily recognised by observers as bird-tracks; but while thinking of what bird could have caused them, and reflecting on the phenomenon of their being only found on the sand near low water-mark, Mr. Meehan noted on the face of the smooth, receding waves, spots where the water sparkled in the light, and he found this was caused by little ripples as the wavelets passed down over the half-exposed bodies of a small crustacean (*Hippa talpoides*), and that the water, in passing over the bodies made the trifid marks which had been taken for impressions of bird's feet. These little crustacea take shelter in the sand near low water-mark, and enter head foremost in a perpendicular direction downwards, resting just beneath the surface. The returning wave took some of the surface sand with it, and then the looser portions of the bodies uppermost in the sand were exposed. Often the little creatures would be quite washed out; when recovering themselves, they would rapidly advance in a direction contrary to the retreat of the wave, and would enter the wet sand again as before, their sides being parallel with the shore. Their bodies terminate in a caruncular point which, with the position of the two hind-legs, offer a tridentate obstruction to the sand brought down by the retreating wave, and the water passing round the points made the three toe-like grooves, which resembled a bird's foot from one and a half to two inches long. The crustacea, in their scrambles for protection beneath the sand, managed to keep at fairly regular distances from each other, and hence there was considerable regularity in the tracks, as if they had really been produced by birds. Although the author of these notes presented them as a trifle, yet it will be at once apparent that they are of great interest. Trifid impressions like these, filled with mud and the deposit then to become solid rock, would puzzle, if not altogether mislead, future observers.

AUSTRALIAN FRESHWATER SPONGES.—Up to this date, but one species of freshwater sponge has been described from Australia, *Spongilla capewelli* of Bowerbank; but Mr. W. A. Haswell, at a meeting of the Linnean Society of New South Wales (May 31, 1882) describes two new species from a pond near Brisbane, and one from the River Bell at Wellington. *Spongilla sceptroides* is a green, smooth, encrusting species, with the skeletal spicules very slightly curved, acute at both ends, ornamented with very minute projecting points. The statoblasts are spherical, defended by long, slender, straight, cylindrical spicules, which are armed with numerous acute spinules, chiefly collected around the extremities, forming heads; it is found growing on submerged twigs. *S. botryoides* is a yellowish flat-encrusting species, with curved skeletal spicules, fusiform, acute, with scattered, extremely minute, projecting points. Statoblasts protected by a crust of short, strongly-curved spicules, with heads at each end of numerous short, blunt, or sub-acute spines, somewhat botryoidal-like, the shaft smooth. This species was found with the first: another species found by Mr. E. P. Ramsay in the Bell River, growing on masses attached to submerged timber

seems nearly related to *S. Meyeni*, from Bombay. In colour it varies from a grass green to a yellow. It is massive, lobulated, with oscula between the projections. The skeleton spicules are perfectly smooth, and the amphidiscs are provided with from one to ten acute and prominent spines. Another species from somewhat deep water is indicated by Mr. Haswell.

EARTH-WORMS IN NEW ZEALAND.—The following interesting observations form part of a communication from Mr. A. T. Urquhart, to the editor of the *New Zealand Journal of Science*, and appear in the September number of that periodical. In October, 1875, I dug a trench on some newly-cleared land—a raised beach at Manukau Harbour. The section then showed about 4½ inches of black mould and a horizontal layer, 1 inch thick, of burnt clay, wood-ashes, small stones, and pumice lying on a brownish-green arenaceous clay. The vegetation cleared was the growth of some thirty years. A portion of the land was left undisturbed. Measurements again taken a few days ago gave an average depth of 1½ inches of turf, 5¼ inches of black mould, and there was no perceptible difference in the layer of ash. An angular block of Trachyte—about twenty-five pounds in weight—placed in May, 1875, had sunk 1 inch, allowing for the turf. As the results of some accurate calculations, as to the number of worms per acre, Mr. Urquhart gives results so considerably higher than Henson's, that he would have hesitated to publish them, were he not in a position to prove them. Henson, it will be remembered by the readers of Darwin on "Vegetable Mould," calculates that there are 53,767 worms per acre in garden mould, and above half that number in corn-fields. Mr. Urquhart's estimates, founded on digging about a quarter of an acre, as well as by a large number of tests on various parts of the fields, some that were under pasture for over sixteen years, gave from four to twenty-six earth-worms per each square foot. The alluvial flats, slopes, and richer portions of the upper lands would average eight to the square foot or say 348,480 per acre. In the uncultivated fern lands worms are scarce. In New Zealand worms not only leave their burrows, but climb up trees in search of food, this chiefly in the night time, though often until a late hour on damp warm mornings.

THE GENESIS OF THE HYPOPHYSIS IN PETROMYZON PLANERI.—Prof. Anton Dohrn, of Naples, writes:—"In his contributions to the history of development of the Petromyzons (*Morphol. Jahrbuch*, vol. vii. p. 158), Mr. W. B. Scott says: 'The organ of smell is one of the most peculiar parts of the whole organisation of the Cyclostoms. . . . The position of the organ is a symmetrical from the very beginning. It first begins to manifest itself as a shallow depression above the mouth, which we may regard as a common depression for the nasal cavity and the hypophysis. The ectoderm covering the head becomes suddenly thickened at one spot, in order to form the special smell sense epithelia which lie close to the front extremity of the brain. The cells at the bottom of the depression decrease in depth, while the cells that cover the opposite wall of the depression (i.e. the continuation of the upper lip) are very low.' Balfour ("Comp. Embryology," vol. ii. p. 358) makes the following criticism upon this statement:—"I have not myself completely followed the development of the pituitary body in Petromyzon, but I have observed a slight diverticulum of the stomodaeum, which I believe gives origin to it. Fuller details are in any case required before we can admit so great a divergence from the normal development as is indicated by Scott's statements." According to researches which I made this summer, the question is solved, but in a way different from either Balfour's or Scott's suggestions. The hypophysis arises rather as an independent depression of the ectoderm between the depressions for the nose and the mouth. Its connection with the nasal depression is only secondary, and is caused by the strong and early development of the upper lip. It has no connection with the mouth depression, because the upper lip develops between the mouth depression and the hypophysis. The particulars of these relations will appear in the next number of the "Studies in the Early Development of Vertebrates" in the *Proceedings* of the Zoological Station at Naples (*Zool. Anzeiger*, November 6, 1882).

FORMIC AND ACETIC ACID IN PLANTS.—Dr. Bergmann sums up the results of his investigations as to the occurrence and import of formic and acetic acids in plants as follows:—I. Formic and acetic acids are met with as constituents of protoplasm throughout the whole of the vegetable kingdom in the most various portions of the plant-organism, and both in chlorophyllaceous and non-chlorophyllaceous forms.

2. Formic and acetic acids are to be regarded as constant products of metastasis in vegetable protoplasm. 3. It is probable that other members also of the unstable group of fatty acids, as for instance, propionic acid, butyric acid, caproic acid, or even the whole group, are universally distributed in the vegetable kingdom. 4. An increase of the amount of unstable acids takes place in a plant-organism when its assimilation is interfered with by deprivation of light, *i.e.* when put into a state of starvation (inanition). 5. Formic and acetic acids accordingly belong to the constituents of regressive tissue-metamorphosis. It has been premised that the homologous, unstable fatty acids have a similar import in vegetable tissue-metamorphosis. 6. No increase in the amount of unstable acids takes place in a plant-organism, which is withdrawn for a period from the light, under the minimum-temperature required for growth. 7. Accordingly the formation of formic and acetic acids in a plant seems to take place to a certain degree independently of respiration. 8. Acetic and formic acids are mainly to be regarded as decomposition products of the constituents of vegetable protoplasm.

GEOGRAPHICAL NOTES

DR. WISSMANN, of the German African Society has, it is stated, just arrived at Zanzibar, having left Loando in April, 1881, in company with Dr. Pogge. Striking inwards across the numerous streams that take their origin in the great watershed which separates the Congo and Zambesi basins, the travellers were at Mukenge, about 6° S. and 22° E., in November last year. Shortly after they set out for Nyangwe on the Lualaba, whence Wissmann proceeded eastwards to Zanzibar, while Pogge turned back to Mukenge, there to plant a station. The details of this journey will doubtless be full of novelty and interest.

THE German African Society has recently issued a report upon its latest undertakings. There are now four German expeditions in Africa, two proceeding from the east, and two from the west. In the east there is Dr. Stecker, who as the companion of Dr. Rohlf's, paid a visit to King John of Abyssinia, and then continued his journey through the Soudan. His last letter is dated February 15. Dr. Böhrn and Dr. Kayser, who belong to Capt. von Schöler's expedition, report upon a three months' journey to Lake Tanganyika, from which they returned to the station at the end of 1881. From the Gondo Station itself Herr Paul Reichard, who remained there, sends a report; Capt. v. Schöler, after founding a station at Kakama, proceeded to Zanzibar. News has also been received regarding the exploration of the Wala River, to the west of Gondo, as far as its mouth, by Dr. Böhrn and Herr Reichard. On the other hand, Robert Flögel is busily at work. He has taken a minute cartographical survey of the hitherto unknown part of the Niger, between Inuri and Shay. In the spring of 1881 he prepared for a journey to Southern Adanana. He reached Keffi at the beginning of December; thence he intended to proceed by way of Schiber, on the Binne River, through the "heathen lands" to Kantscha and Yola, south of the Binne, then winter there, and thence proceed by water from Meo Kebbi to the Tubori Marsh to Kuka.

AT the beginning of November, Dr. Arthur Krause returned to Germany from his journey to the Chukchi Peninsula and Alaska, which he undertook, partly in company with his brother, Dr. Aurel Krause, and partly alone, at the instance of the Bremen Geographical Society. Dr. Aurel Krause returned to Germany last summer by way of Panama, while his brother remained in Alaska until the autumn. The two brothers have made copious collections of natural history and ethnographical specimens.

THE November number of *Petermann's Mittheilungen* contains an account by Dr. Gerhard Rholfs of the results of his recent journey in Abyssinia. Dr. Ferd. Löwl, of Prag, has a long and able paper on the origin of transverse-valleys; Lieut. Kreitner describes the route from Ansifan through the Gobi desert to Hami; while there are interesting letters from Emin-Bey, Lupton-Bey, and Dr. Junker, mainly referring to the work of the Russian explorer in the Welle region. He has been doing much to clear up the hydrography of the region, and has come to the conclusion that the Welle is really the upper course of the Shari, while the Aruwimi, the great tributary of the Congo, rises further to the east.

A SPECIAL supplement to the *Chamber of Commerce Journal* contains an account by Mr. Colquhoun of his recent journey through Yunnan to Burmah, accompanied by an excellent map. Under the title of "Across Chrysê," Messrs. Sampson Low and Co. will shortly publish a detailed narrative, with many illustrations, of Mr. Colquhoun's journey.

THE ordnance survey of Scotland, a work which has been going on for thirty-seven years, has been completed, and the surveying staff will be withdrawn from Scotland next week. During the last few years nearly a hundred men have been employed in the work.

THE Emperor of Russia has ordered 2200*l.* to be allotted from the Imperial Treasury to the Russian traveller in New Guinea and the Malay Archipelago, M. Miklucho Maklay, in order to enable him to work up the results of his explorations. His Majesty has also ordered M. Maklay to be informed that the cost of the publication of his book of travels will be defrayed by the privy purse.

THE PELAGIC FAUNA OF FRESHWATER LAKES

SEVERAL naturalists have within recent years made the pelagic fauna of freshwater lakes in various regions a subject of study. In the *Archives des Sciences* for September, Prof. Forel gives a list of those researches, with a *résumé* of the results they have yielded.

This fauna has but few species; but the number of individuals of each species is, on the other hand, enormous. The following is an enumeration of the species observed:—

OSTRACODA: *Cypris ovum*. CLADOCERA: *Sida crystallina*, *Daphnella brachyura*, *D. pulex*, *D. magna*, *D. longispina*, *D. hyalina*, *D. cristata*, *D. galeata*, *D. quadrangula*, *D. mucronata*, *Bosmina longirostris*, *B. longispina*, *B. longicornis*, *Bythotrephes longimanus*, *Leptodora hyalina*. COPEPODA: *Cyclops coronatus*, *C. quadricornis*, *C. serrulatus*, *C. tenuicornis*, *C. brevicornis*, *C. minutus*, *Heterocope robusta*, *Diaptomus castor*, *D. gracilis*.

The author excludes from consideration those animals that enter into the pelagic fauna in an accidental and accessory way, such as fishes (especially *Coregonus*), preying on the entomostrea, and other fishes which prey on those, also infusoria living on pelagic algae, and animals coming occasionally from the border or the bottom of a lake.

The pelagic fauna is, in its general traits, very much the same in all European lakes where it has been examined, from the plains to the Alps, from Scandinavia to Italy. But it is rarely represented in one lake by all animals of the fauna. Pavesi has made a very complete study, in this respect, of the Italian lakes, giving, for each, a complete list of the species found. But an observation by Weissmann has to be remembered here. He found that the different species of Cladocera presented an annual periodicity; they disappear at certain seasons (different for different species), when they are represented only by eggs. Thus the list of pelagic animals of a lake, to be complete, must be based on numerous takes in different seasons.

The common characters of the fauna accord with the mode of life, which involves constant swimming; thus the animals have no organ of fixation, but a well-developed organ of natation. Their density, nearly equal to that of water, enables them to float between two waters without exerting themselves much. Their movements are slow, and they escape enemies rather by their transparency than by agility. This transparency is, indeed, their essential character; they do not generally show a visible point, except that of their eye, which is strongly pigmented with black, brown, or red. The quality of transparency may be interpreted as a case of mimicry.

The food of the fauna is vegetable or animal. Some feed on pelagic algae, few in species, *Anabena circinalis*, *Pleurococcus angulosus*, *Pl. palustris*, *Tetraspora virescens*, *Palmella Ralfsii*, but very abundant in individuals; others pursue and eat the smallest animal species living in the same waters.

The pelagic animals present daily migrations; swimming near the surface at night, and remaining in the depths by day. Fric thought he found, in the Bohemian lakes, each species select a determinate depth; neither Pavesi nor the author have observed such constancy. The different species form groups, or troops, where the net makes rich captures, but these banks of animals of the same species, have not, at least in the large Swiss lakes, a determinate fixed position.